**pHet Sims: Reactants, Products & Leftovers  Name: _____ Period: _____**

**Directions:** go to pHet online. Click on the link for the simulation on Assignment ___on Ms Keefe's website.

On 'sandwiches' ' cheese' sim:

1. Start with 3 breads and 2 cheese. How many products are made? ____
    a. What are the leftovers? _____
2. Add a slice of cheese. How many products are made? _____
    a. What are the leftovers? _____
3. Now have 8 breads and 3 cheese. How many products are made? _____
    a. What are the leftovers? _____
4. Now try 8 breads and 8 cheese. How many products are made? _____
    a. What are the leftovers? _____
5. With the 8 breads and 8 cheese – what did you run out of first? **(this is your limiting reactant)** _____
6. Now play with it and find out the max number of products which can be made without any leftovers. How many of each reactant were used? _____
    a. How many of the product was produced? _____

On 'sandwiches meat and cheese' sim:

7. Play with the sim and try to make only one sandwich with no leftovers. How many of each reactant were used? _____
8. Now max every reactant out. How many of each reactant is that? _____
    a. How many products can be made? _____
    b. How many of which leftovers are created? _____
    c. Which reactant was your limiting reagent? _____

9. Now maximize the number of products without having any leftovers. How many of each reactant are used? _____ How many products were made? ____

On 'sandwiches custom' sim

10. Set it on a triple decker meat and cheese sandwich at the top. How many of each reactant will you need to make one triple decker meat and cheese sandwich?
    _____
11. Now max out how many products can be made without leftovers.
    a. How many of each reactant did you use?
       _____
    b. How many products did you produce? _____
12. Now max out all of the reactants.
    a. How many products were produced? _____
    b. How many of each leftover were there?
       _____
13. What is the limiting reactant in the triple decker sandwich? _____

Using the 'molecules – make water' sim

14. Make a single water molecule.
    a. How many of each reactant were used?
       _____
    b. What is the mole ratio **(how many of each reactant and product are there)?**
       _____

    Now write it as a chemical reaction: _____
15. Max out how many water molecules that can be made without leftovers/excess.
    a. How many of each reactant were used?
       _____
    b. How many products were produced?
       _____

c. What is the mol ratio **(how many of each reactant and product are there)?**

_____

d. Now express it as a chemical equation:

_____

16. Now max out every reactant.

a. How many products were made? _____

b. How many and what were the leftovers/excess?

_____

17. What is the limiting reactant? _____

Using the 'molecules – make ammonia' sim

18. Make a single ammonia molecule.

a. How many of each reactant were used?

_____

b. What is the mol ratio? _____

c. Write it as a chemical equation:

_____

19. Play with it until you find the max amount of ammonia that can be produced without any leftovers.

a. How many of each reactant are used? _____

b. How many ammonia molecules are produced? _____

c. Write it as a chemical equation:

_____

20. Now max all of the reactants.

a. How many ammonia molecules are produced? _____

b. How many of each leftover are there?

_____

c. What is the limiting reactant in this reaction?

_____

Using the ‘molecules – combust methane’ sim

21. Produce a single carbon dioxide molecule without any leftovers.

    a. How many of each reactant are used?

       _____

    b. How many of each product are produced? _____

    c. What is the mol ratio: _____

    d. Write the reactant in a chemical equation form:

       _____

22. Now max all of the reactants out.

    a. How many of each product are formed?

       _____

    b. How many of what leftover are there?

       _____

23. Now maximize the number of products produced without leftovers.

    a. How many of each reactant are consumed? _____
       How many of each product are produced? _____
       What is the mol ratio? _____

    b. Now write it as a chemical equation:

       _____

24. What is the limiting reagent in this reaction? _____

    a. How do you know? _____

Now use the ‘Reactants, Products & Leftovers – Game’

Call the teacher over when you have scored an 8 or better on level 1 _____ (teacher initial) You’re up to a ‘C’ for this assignment.

Call the teacher over when you have scored an 8 or better on level 2 _____ (teacher initial) You’re now up to a ‘B’ for this assignment.

Call the teacher over when you have scored an 8 or better on level 3 _____ (Teacher initial) You’re now up to an ‘A’ for this assignment